

# LOWER MAINLAND (#196)

The Lower Mainland ecoregion occurs along the southern Pacific coast of BC, and is part of the coastal temperate rainforests that extend from California to Alaska. This ecoregion is characterized by the vast Fraser River floodplain and associate delta as well as lush coastal forests. The Fraser River estuary provides overwintering or migratory stopover habitat for upwards of 250,000 waterfowl and over 1 million shorebirds. This ecoregion supports more overwintering birds than anywhere else in Canada. There are 23 species at risk that have been documented here, and 18 species that are of global conservation concern. Approximately 58% of this ecoregion remains in natural cover and 5.2% is within conserved/protected areas.

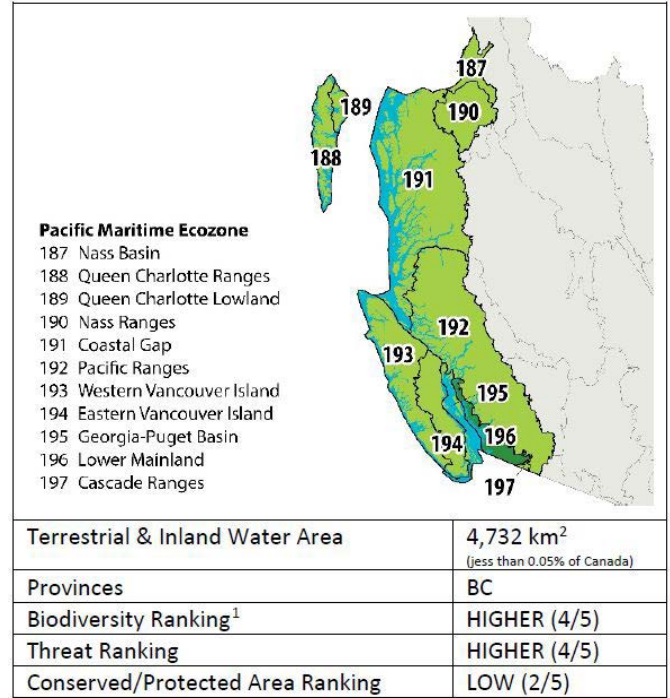
## LOCATION

The Lower Mainland ecoregion follows the Pacific coast from the U.S. border north to the Strait of Georgia along the Sunshine Coast. It extends westward from the foothills of the Cascade Range at Chilliwack to the Fraser River delta at Richmond. This ecoregion is part of BC's Coastal Douglas-Fir Biogeoclimatic Zone. It is the northern extension of the Central Pacific Coastal Forests, a region of coastal temperate rainforests that extends from southern Oregon to the northern tip of Vancouver Island.

## CLIMATE/GEOLOGY

The ecoregion is one of the warmest in Canada. The mean average annual temperature is approximately 9°C, with an average temperature of 15°C in the summer and 3.5°C in the winter. Mean annual precipitation ranges from 850 to 2,000 millimetres. Most precipitation falls as rain at low elevations.

This coastal ecoregion rises to approximately 310 metres above sea level. The landscape is quite mountainous, rising into the Pacific Range, with the exception of the vast lowlands of the Fraser River valley and delta.



## VEGETATION

This vegetation of this ecoregion is dominated by coastal western hemlock rainforests that thrive in the wet, temperate climate found on BC's coast. These wet forests are characterized by towering old-growth western hemlock (*Tsuga heterophylla*) and western red-cedar (*Thuja plicata*) in mature stands. Mixed stands of coastal Douglas-fir (*Pseudotsuga menziesii*) were historically found on drier sites in the rain shadow of both the Vancouver Island Ranges and the Olympic Mountain Range, with an understory of salal (*Gaultheria shallon*), Oregon grape (*Mahonia nervosa*) and mosses. They are one of the most imperiled coastal ecosystems, having been altered drastically by human development. Wetter sites support Douglas-fir and western hemlock, with western red cedar. Red alder (*Alnus rubra*) is common where sites have been disturbed.

<sup>1</sup> Ranking categories for biodiversity threat and conserved/protected area are relative to other ecoregions in the southern Canada study area (5=highest, 4=higher, 3=high, 2=low, 1=lower, 0=lowest). The lowest score for conserved/protected area is 1. For biodiversity and threat, the highest category based on measures and criteria approach is used.

## FRESH WATER AND COASTS

This ecoregion is dominated, and was formed by, the Fraser River. A number of smaller rivers flow into the Fraser within the ecoregion, including the Pitt and Chilliwack rivers. Numerous other rivers and creeks flow into the Pacific Ocean north of the Fraser River, including the Squamish River.

Wetlands and inland water cover approximately 1.1% and 5.8% of the ecoregion, respectively. Most of the wetlands are associated with the Fraser River floodplain and delta. There are several small freshwater lakes, including Cultus Lake, Beaver Lake and Burnaby Lake.

There is approximately 2,033 kilometres of marine coast in this ecoregion, along the mainland and associated islands (e.g. Bowen Island). Most of the coast is rocky, with many inlets (e.g. Howe Sound) and scattered sandy beaches. In addition to the Fraser River delta, there are numerous smaller estuaries and salt marshes along the coast. Tides can be up to four metres in height, with occasional “king tides” that can reach five metres. Key marine habitats include kelp beds and glass sponge reefs.

## AT-RISK VEGETATION COMMUNITIES

Globally and provincially rare vegetation communities have been very well documented in this ecoregion. These associations include:

- northern wormwood - red fescue/grey rock-moss
- large-headed sedge herbaceous vegetation
- Garry oak/oceanspray

## WILDLIFE

Characteristic wildlife in the Lower Mainland ecoregion includes Columbian black-tailed deer (*Odocoileus hemionus columbianus*), raccoon (*Procyon lotor*), harbour seal (*Phoca vitulina*), North American river otter (*Lontra canadensis*), American mink (*Vison vison*) and bald eagle (*Haliaeetus leucocephalus*). This ecoregion is also very important for migratory birds and provides overwintering or migratory stopover habitat for upwards of 250,000 waterfowl and over 1 million shorebirds.

## AT-RISK PLANTS AND ANIMALS

There are 23 national species at risk in the ecoregion. In addition, there are 18 species of global conservation concern, with the highest numbers associated with the area around Coquitlam (Figure 2). Many species at risk can be found within the Greater Vancouver area.

Species at risk include:

- Pacific giant salamander (*Dicamptodon tenebrosus*)
- Audouin’s night-stalking tiger beetle (*Omus audouini*)
- Pacific great blue heron (*Ardea herodias fannini*)
- white sturgeon - Lower Fraser River population (*Acipenser transmontanus pop. 4*)\*
- mountain beaver (*Aplodontia rufa*)
- Oregon forest snail (*Allogona townsendiana*)\*
- Roell’s brotherella moss (*Brotherella roellii*)\*
- western painted turtle - Pacific Coast population (*Chrysemys picta pop. 1*)\*
- Vancouver Island beggarticks (*Bidens amplissima*)\*

\*nationally and globally at risk (NatureServe)





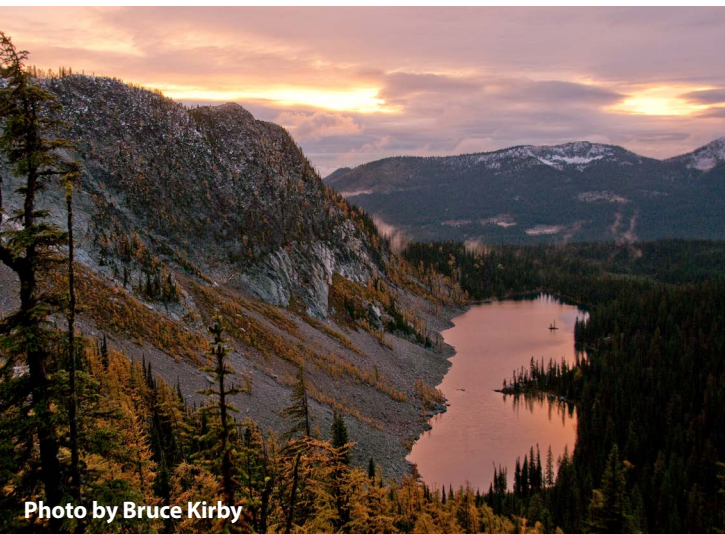


Photo by Bruce Kirby

## LAND USE

This ecoregion includes Vancouver and its expanding suburbs. Urban land use occupies just over 28% of the ecoregion. The lowland areas are very productive farmland, and agriculture now occupies 13.2% of this ecoregion (Figure 3). Forestry occurs on higher slopes of the mountains.

There has been a moderate and steady expansion of urban areas in this ecoregion. The expansion of settlements have mostly occurred in areas that were previously forested, with a smaller amount expanding into croplands (Table 1). BC's Agricultural Land Reserve system has restricted the expansion of urban areas into farmlands in this ecoregion.

Major urban centres include Vancouver, Richmond, Surrey, Langley and Abbotsford. The total population is 2,786,670 (2016), with a growth of 34% in the last 20 years.

## CONSERVATION CONCERNS

This ecoregion is part of the Central Pacific Coastal Forests, which has been identified as one of 200 global ecoregions that are a priority for conservation. The diverse terrestrial, freshwater and marine ecosystems of this ecoregion are being impacted by several threats, including habitat conversion, invasive species and climate change. Some areas of this ecoregion have experienced very high rates of historical land conversion. For example, it is estimated that 80% of the Fraser River Delta has been lost, largely to agriculture. This includes the draining and filling of the 11,700-hectare (28,911-acre) Sumas Lake wetland in the 1920s (Mackenzie and Shaw 2000). Very high and high threats identified from the Nature Conservancy of Canada's (NCC's) Natural Area Conservation Plan (NACP) (Salish Sea) that applies to this ecoregion include:

- urban and agricultural expansion
- invasive species in terrestrial, freshwater and marine ecosystems (e.g. feral domestic cats, brown trout, green crab)
- problematic native species (e.g. resident Canada geese that impact wetlands)
- over-harvest (intertidal and sub-tidal marine molluscs and salmon)
- fire suppression (coastal Douglas-fir ecosystems)
- industrial use of fresh water, pipelines, oil tanker traffic, water pollution, shoreline modifications
- observed impacts of climate change, including an increasing frequency of droughts, rising sea levels and warming waters of the Fraser River that could impact salmon

## CURRENT CONSERVATION STATUS

The Lower Mainland ecoregion has 58.6% natural cover, but most of this is restricted to the northern extent and in higher elevations where this ecoregion meets the Pacific Ranges. There are limited opportunities for large-scale connectivity across the ecoregion, with the exception of the Fraser River and along its eastern limits (Figure 4).

Just over 5% of the ecoregion is in conserved/protected areas (Figure 5). The largest protected areas include provincial parks and wild-life management areas. The diversity of landform features in this ecoregion are poorly represented in the current system of protected areas.

This ecoregion has many conservation designations. The ecoregion has one Ramsar Wetland of International Importance (Fraser River Delta) and eight Key Biodiversity Areas that protect important landbird, shorebird, waterbird and waterfowl habitats. These include Boundary Bay-Roberts Bank-Sturgeon Bay, Chehalis River Estuary, Desolation Sound, White Islets and Wilson Creek, and Jervis Inlet-McRae Islet, which are globally significant; English Bay-Burrard Inlet, which is continentally significant; Greater Vancouver Watershed; and Pacific Spirit Regional Park.

NCC has one NACP<sup>2</sup> within the ecoregion, which covers 83.4% of the ecoregion: Salish Sea. NCC has completed several land securement projects in the ecoregion, protecting over 90 hectares (220 acres). Key properties include Mud Bay, Swishwash Island Nature Sanctuary and Francis Point Ecological Reserve.

<sup>2</sup> NACPs that cover >5% of the ecoregion as of December 31, 2017.

## POTENTIAL CONSERVATION STRATEGIES

The Lower Mainland ecoregion is important for national and global biodiversity conservation and for the well-being of millions of Canadians. There are significant opportunities in this ecoregion for conservation that protects and restores habitats for species at risk, migratory birds and marine wildlife, maintaining the ecological services that support communities and integrating nature into climate change adaptation.

Potential conservation strategies for this ecoregion include:

1. Maintain natural cover at over 58% over the next 10 years, with a focus on large, intact landscapes, coastal habitats and sites with high concentrations of species at risk and migratory birds.
2. Increase the amount of conserved lands to 10% in the next 10 years, including accounting for existing lands protected by provincial land trusts and municipal parks.
3. Accelerate efforts to monitor and manage invasive species. As a major port and trading centre, the number of invasive species is likely to rise.
4. Identify and implement focal areas for species at risk recovery and the protection and restoration of habitats of global conservation concern, including within urban areas. This could include developing baseline reporting and conservation recommendations on coastal habitats.
5. Ensure “green infrastructure” and coastal resiliency are incorporated into climate change adaptation plans to respond to rising sea levels. This could include a cost-benefit analysis of a “retreat” strategy in some low-lying agricultural lands that are most vulnerable to rising sea levels.

## KEY REFERENCES

Demarchi, D.A. 2011. *An Introduction to the Ecoregions of British Columbia*. Ecosystem Information Section Ministry of Environment. Victoria, British Columbia.

Ecological Stratification Working Group. 1995. *A National Ecological Framework for Canada*. Agriculture and Agri-Food Canada, Research Branch, Centre for Land and Biological Resources Research and Environment Canada, State of the Environment Directorate, Ecozone Analysis Branch, Ottawa/Hull. Report and national map at 1:7500 000 scale.

Ricketts, T., E. Dinerstein, D. Olson, C. Loucks, W. Eichbaum, K. Kavanagh, . . . W. Walters. 1999. *Ecoregions of North America: A Conservation Assessment*. Washington DC: Island Press.

Suggested citation: Nature Conservancy of Canada. 2019. *Ecoregional summary – Lower Mainland*. Nature Conservancy of Canada, Toronto.

Last updated: data (August 2017); text (December 2019)



## LARGEST CONSERVED AREAS

(TOP 10, BY SIZE)<sup>3</sup>

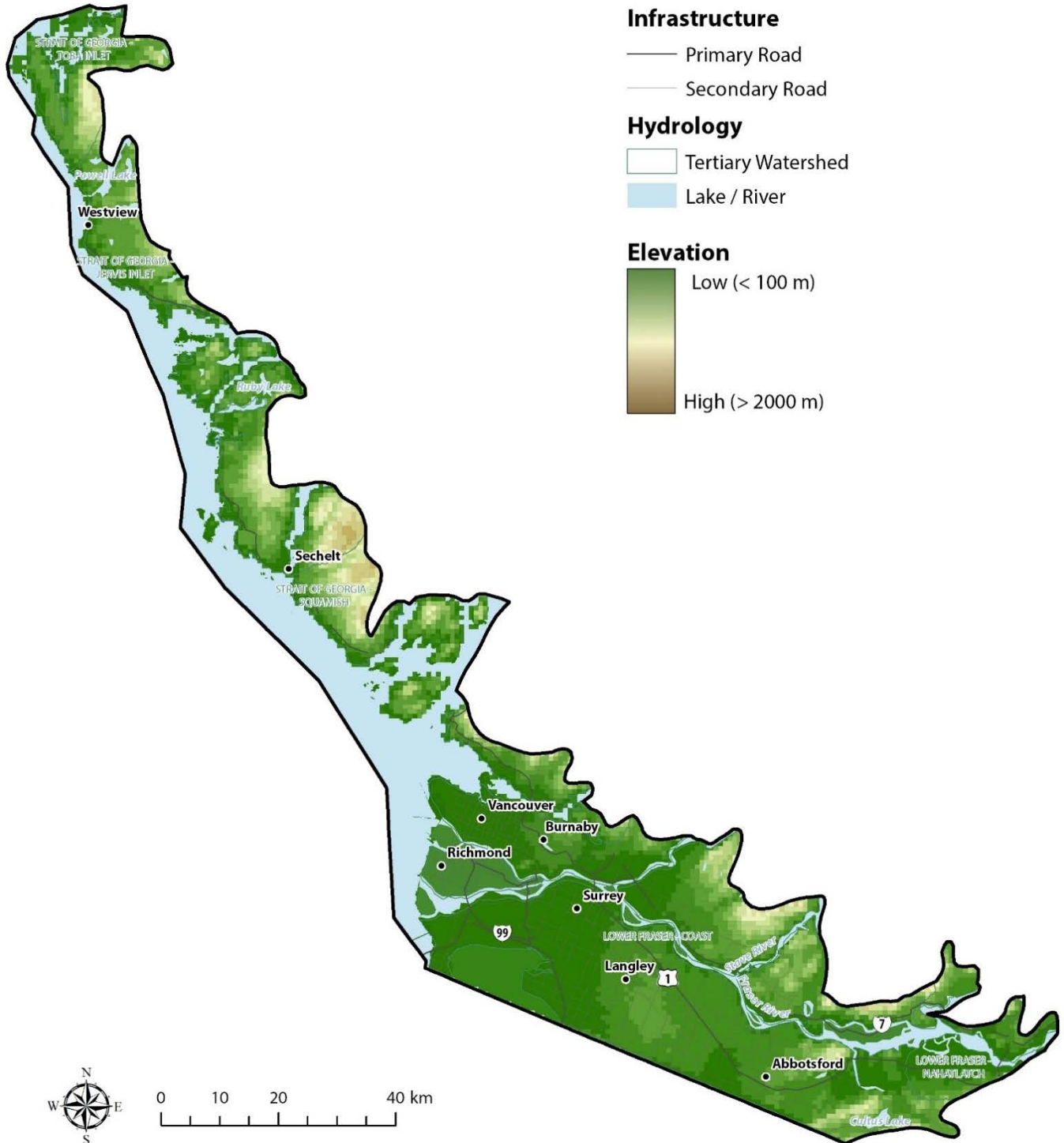
1. Desolation Sound Marine Park (5,431 hectares/13,420 acres, plus an additional 2,708 hectares/6,692 acres of marine areas)
2. Pitt-Addington Marsh Wildlife Management Area (2,972 hectares/7,344 acres)
3. Inland Lake Park (2,757 hectares/6,813 acres)
4. Cultus Lake Park (2,561 hectares/6,328 acres)
5. Mount Richardson Park (1,000 hectares/2,471 acres)
6. Bert Brink Wildlife Management Area (915 hectares/2,261 acres)
7. Duck Lake Protected Area (768 hectares/1,922 acres)
8. Malaspina Park (572 hectares/1,413 acres)
9. Simson Park (461 hectares/1,139 acres)
10. Bowen Island Ecological Reserve (399 hectares/986 acres)

There are also several large Marine Protected Areas in this ecoregion, including Boundary Bay Wildlife Management Area (11,525 hectares/28,479 acres), Roberts Bank Wildlife Management Area (8,770 hectares/21,693 acres), Sturgeon Bank Wildlife Management Area (7,757 hectares/19,168 acres) and the Strait of Georgia and Howe Sound Glass Sponge Reef closure (761 hectares/1,880 acres).

To learn more about this ecoregion and NCC's conservation assessment for southern Canada, visit [natureconservancy.ca/casc](https://natureconservancy.ca/casc).

<sup>3</sup> Small portions of several large protected/conserved areas also intersect this ecoregion, including Golden Ears Park (62,539 hectares/154,537 acres) Pinecone Burke Park (38,000 hectares/93,900 acres) and Tetrahedron Park (6,000 hectares/14,826 acres).

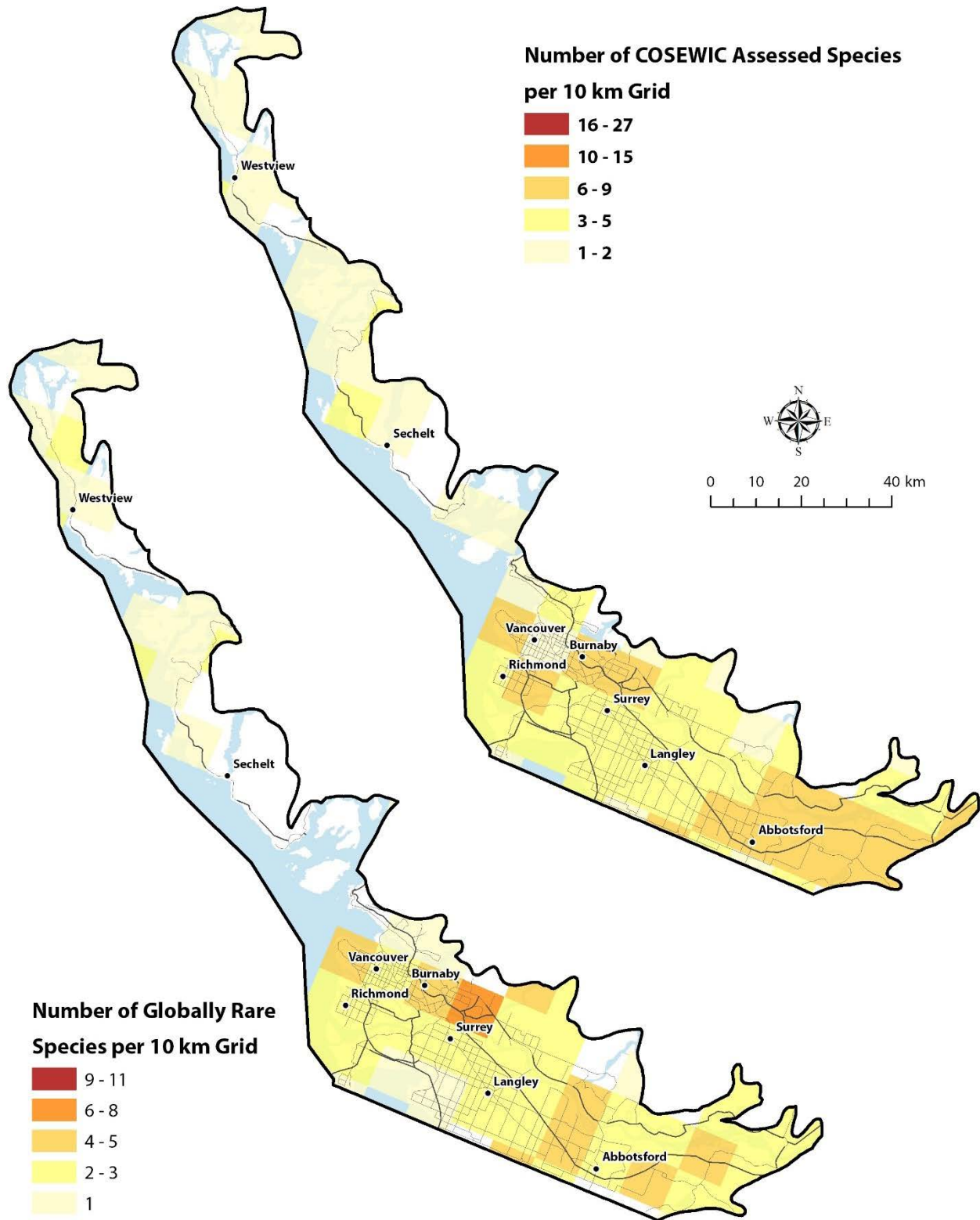
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**Figure 1: Context of the Ecoregion.** This map shows towns, roads, elevation, rivers, lakes and watersheds.

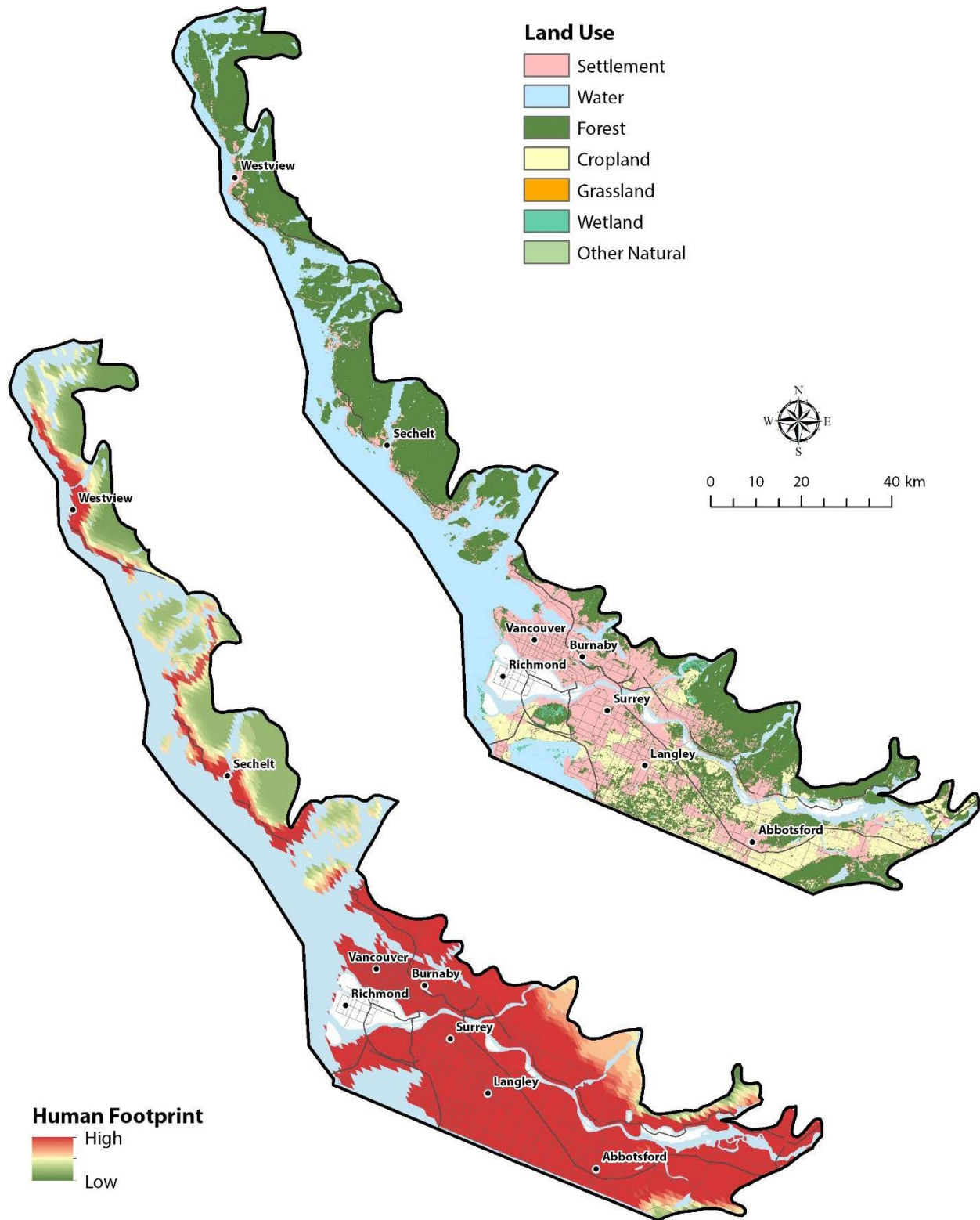


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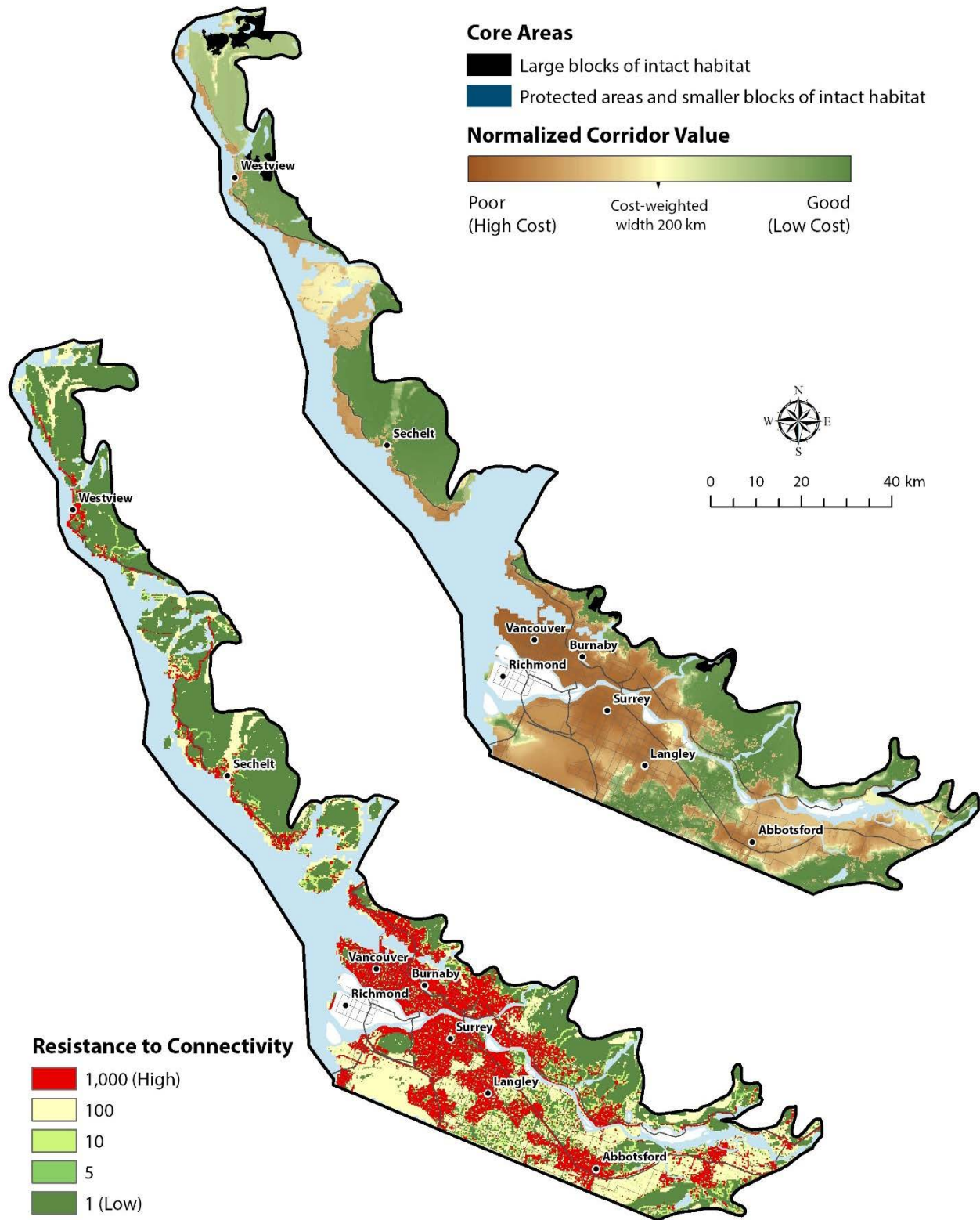
**Figure 2: Species of Conservation Concern (COSEWIC and global).** These maps show the number of different Committee on the Status of Endangered Wildlife in Canada (COSEWIC)-assessed and globally rare species. The information is current to 2015. Some areas of the ecoregion may be data deficient and higher numbers of species of conservation concern may occur.

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**Figure 3: Land Use & Human Footprint.** These maps show the dominant land uses and the human influence on the landscape. Human footprint is highest in urban areas, around major roads and on lands that have been converted to croplands. The human footprint map does not show some stresses that may occur, such as invasive species.

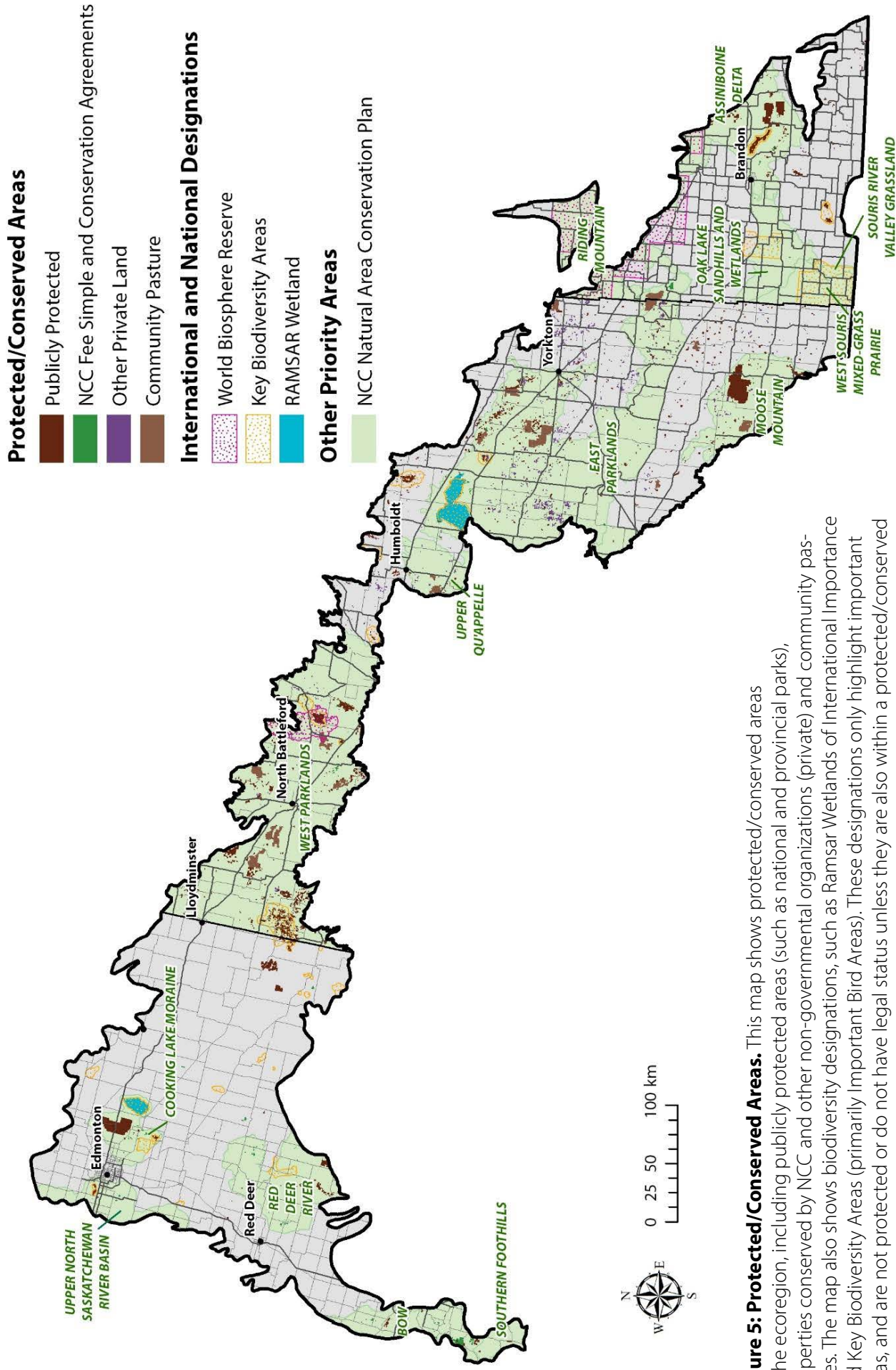
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**Figure 4: Connectivity.** These maps show connectivity between protected/conserved areas and large blocks of intact habitat. The map on the right depicts those regions (green) that have a higher probability of being connected within the ecoregion.

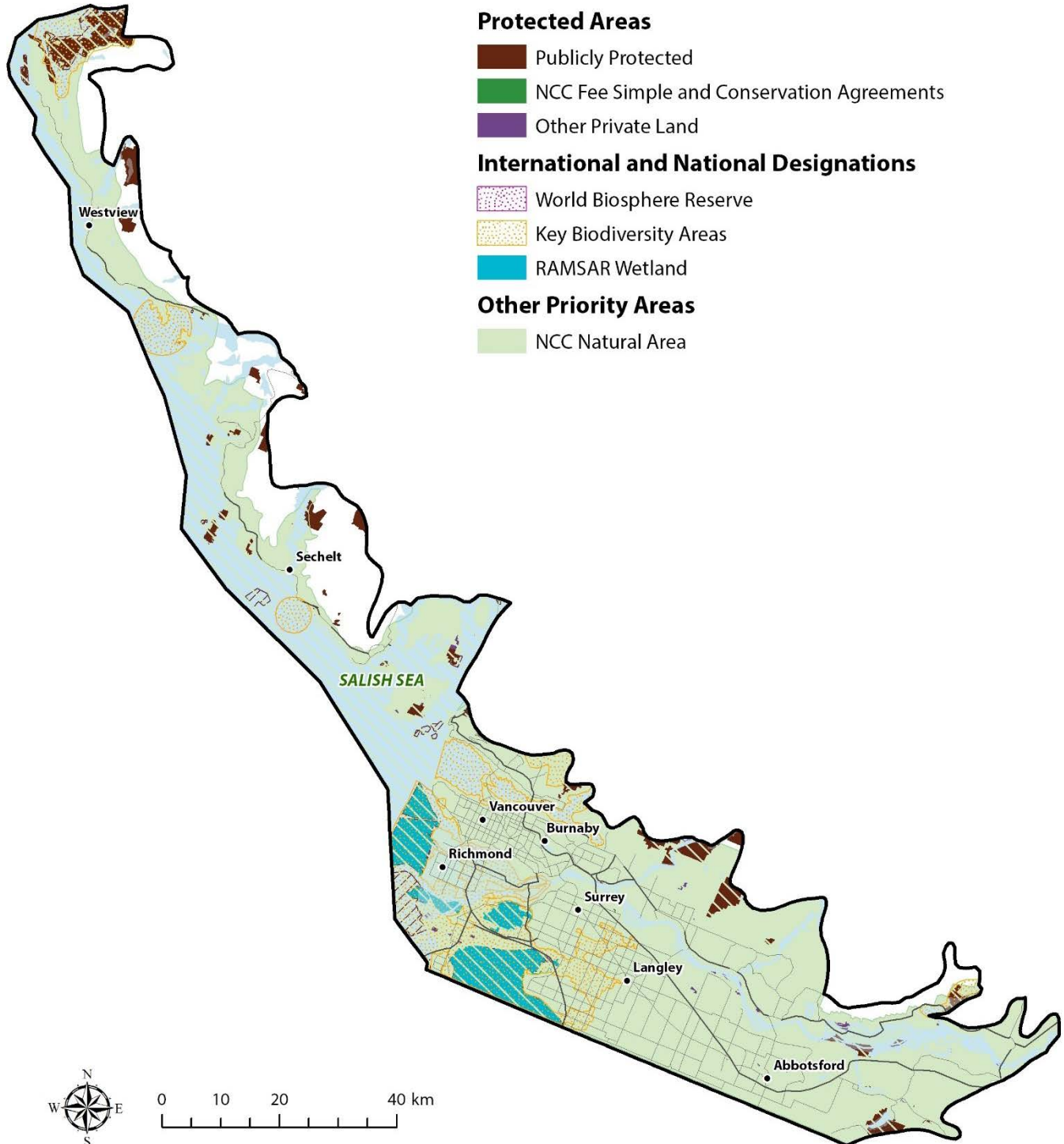


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**Figure 5: Protected/Conserved Areas.** This map shows protected/conserved areas in the ecoregion, including publicly protected areas (such as national and provincial parks), properties conserved by NCC and other non-governmental organizations (private) and community pastures. The map also shows biodiversity designations, such as Ramsar Wetlands of International Importance and Key Biodiversity Areas (primarily Important Bird Areas). These designations only highlight important areas, and are not protected or do not have legal status unless they are also within a protected/conserved area. The map also shows the boundaries of NCC Natural Area Conservation Plans.

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**Table 1: Change in Land Use, 2000-2010**

Land Use Class	Code	Change To 2010 (km <sup>2</sup> )																			Total (From)	Percent (%) of Total Change						
		11	21	25	31	41	42	45	46	51	61	62	71	73	74	91												
Unclassified	11		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
Settlement	21	0.0		89.65	5.32	17.83	0.08	1.72	0.03	10.70	0.02	0.01	0.03	0.14	0.08	0.48									126.1	28.6		
Roads	25	0.0	95.62		0.47	11.11	0.00	0.91	0.01	7.20	0.03	0.00	0.01	0.04	0.04	0.07										115.5	26.2	
Water	31	0.0	4.67	0.89		10.82	0.28	0.82	0.11	0.93	0.02	0.00	0.22	0.23	0.93	1.52											21.4	4.9
Forest	41	0.0	59.36	18.78	10.28		0.63	0.59	0.30	11.80	0.08	0.06	0.48	1.17	0.27	1.27											105.1	23.8
Forest Wetland	42	0.0	0.07	0.04	0.25	0.76		0.08	0.01	0.12	0.0	0.0	0.26	1.08	0.19	0.00											2.9	0.7
Trees	45	0.0	7.57	1.39	0.75	0.01	0.09		0.03	3.34	0.00	0.0	0.06	0.07	0.08	0.13											13.5	3.1
Treed Wetland	46	0.0	0.06	0.01	0.16	0.27	0.0	0.03		0.05	0.0	0.0	0.04	0.16	0.14	0.01											0.9	0.2
Cropland	51	0.0	18.35	8.59	0.97	11.06	0.03	3.11	0.04		0.08	0.00	0.15	0.07	0.16	0.29											42.9	9.7
Grassland Managed	61	0.0	0.04	0.04	0.04	0.02	0.0	0.01	0.00	0.07			0.0	0.0	0.0	0.01											0.2	0.1
Grassland Unmanaged	62	0.0	0.06	0.01	0.00	0.04	0.0	0.0	0.00	0.03	0.0		0.0	0.0	0.00	0.01											0.2	0.0
Wetland	71	0.0	0.10	0.03	0.25	0.41	0.29	0.06	0.04	0.17	0.0	0.0	0.22	0.18	0.16	0.04											1.7	0.4
Wetland Shrub	73	0.0	0.15	0.03	0.30	0.95	1.11	0.07	0.19	0.11	0.0	0.00	0.22		0.62	0.07											3.8	0.9
Wetland Herb	74	0.0	0.14	0.02	0.90	0.24	0.23	0.10	0.14	0.17	0.0	0.0	0.17	0.61		0.06											2.8	0.6
Other	91	0.0	0.76	0.12	2.23	0.77	0.00	0.14	0.01	0.30	0.01	0.00	0.04	0.02	0.06												4.4	1.0
<b>Total (To)</b>		0.0	186.9	119.6	21.9	54.3	2.7	7.6	0.9	35.0	0.2	0.1	1.7	3.8	2.7	4.0											<b>441.5</b>	
<b>Net Change (To-From)</b>		0.0	60.8	4.1	0.5	-50.8	-5.6	-5.9	-0.0	-7.9	-9.5	-0.1	-0.1	-0.0	-0.1	-0.5												
<b>Percent (%) of Total Change</b>		0.0	42.3	27.1	5.0	12.3	0.6	1.7	0.2	7.9	0.1	0.0	0.4	0.9	0.6	0.9												
<b>Net Gain/Loss %</b>		0.0	13.8	0.9	0.1	-11.5	-0.0	-1.3	-0.00	-1.8	0.1	-0.02	-0.0	-0.0	-0.01	-0.1												

\* Diagonal represents unchanged land use